

ABSTRACT

The present invention comprises devices and methods for performing channel-less separation of cell particles by dielectrophoresis, DC high voltage-pulsed electronic lysis of separated cells, separation of desired components from crude mixtures such as cell lysates, and/or enzymatic reaction of such lysates, all of which can be conducted on a single bioelectronic chip. A preferred embodiment of the present invention comprises a cartridge (10) including a microfabricated silicon chip (12) on a printed circuit board (14) and a flow cell (16) mounted to the chip (12) to form a flow chamber. The cartridge (10) also includes output pins (22) for electronically connecting the cartridge (10) to an electronic controller. The chip (12) includes a plurality of circular microelectrodes (24) which are preferably coated with a protective permeation layer. Specific cells from various cell mixtures were separated, lysed, and enzymatically digested on the chip.